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collection contains specimens from Chester, England (Newstead); and on the white oak from Stettin, Prussia (Pergande).

Aspidiotus spurcatus has been reported from France and Italy on poplar and Platanus.

It will be noted that the Department and other records exhibit not only a wide range of food plants, but a very extended distribution in Europe, both geographically and as to climate. This scale insect, therefore, seems to be one well worthy of attention and one that will bear watching. It is to be hoped that it will not be as disastrous to our fruit interests as have been other foreign scale insects imported to our shores.

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NOTE: After returning the proof of the above to SCIENCE, part of the type material of a supposed new species of *Aspidiotus* (*A. hunteri*), found in 1897 on currant at Alton, Iowa, was sent to this department by the describer of the species, Mr. Wilmon Newell, Assistant Station Entomologist, Iowa Experiment Station. The material in question proves to belong to *ostreaformis*, and is very interesting as showing the occurrence of this species so far west and also as indicating a new food plant.

CROSS-EDUCATION.

THE term 'cross-education' is used to express the theory that the effects of practice on one side of the body are transferred to the unpracticed side. The subject has been investigated during the past year at the Yale Psychological Laboratory in the effort definitely to establish the fact of transference of practice and to arrive at an explanation of the causes of such transference. Following is a brief summary of the experiments carried on and the results obtained from them:

a. Rapidity of voluntary effort.—A tap-counter was constructed from clock-work and connected electrically with a telegraph key. At each pressure of the key by the hand or the foot the counter registered one tap. Records of maximum rapidity of tap-

ping were taken for right and left index fingers and right and left great toes separately. Then for two weeks the right great toe alone was practiced in tapping daily for a considerable time. Then all four digits were tested as at the start. The result for six subjects showed that the average relative gain for the right great toe—the member practiced—was 31%; for the left great toe, 30%; for the right index finger, 20%; for the left index finger, 28%. The last three had, therefore, gained by practice of the first.

b. Strength of voluntary effort.—Six subjects were tested as to the number of times they could raise a dumb-bell weighing $2\frac{1}{4}$ kilos (5 lbs.). Girth measurements of the right and left arms were taken and the dynamometric pressure of each hand was determined. For two weeks the right arm alone was exercised in raising the dumb-bell. Results: (1) The average gain of the right arm in the number of flexions made was 470%; of the left arm, 150%. (2) The average gain in the girth of the right biceps was $6\frac{1}{2}$ mm.; of the left biceps, $2\frac{5}{8}$ mm.; of the right forearm, $4\frac{5}{8}$ mm., and of the left forearm, $2\frac{1}{8}$ mm. (3) The average dynamometric pressure increased in the right hand 13%, in the left 13%. (4) Practice of the right arm inured both arms to resist the after-effects of violent exercise as revealed by stiffness, pain and soreness. These experiments proved not only the fact of cross-education in ability to do work, but also the fact of cross-development, in a lesser degree, of the symmetrical muscles.

c. Accuracy of voluntary effort.—A target was so devised that permanent records of accuracy in lunging with a fencer's foil could be obtained. Records of both right and left hands were secured with six subjects. The lunging was then practiced for two weeks with the right hand only. Thereafter both hands were tested. Results: (1) Both hands had gained in accuracy,

the right 52%, the left 36%. (2) In both right- and left-handed lunging, the body had gained in grace and coordination of movement. (3) The probable errors of both hands had been markedly decreased as the result of the practice of the right hand.

Cross-education may be the result chiefly of changes wrought in the central nervous system. In the tapping, in which a minimum of muscular strength is required, the gain is about equal on both sides. In the test of strength a smaller proportional gain was found in the side not practiced. The transference of peripheral effects cannot be ignored altogether, since in the dumb-bell test there was a decided increase in the girth of the arm not practiced, and in its power to resist fatigue.

The facts may be explained as the result of two factors: (1) the close nervous connection, through motor centers, between symmetrical muscle groups on opposite sides of the body and between groups related in function or position; (2) the development of general will power and attention, through the practice of one form of volition.

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SCIENTIFIC BOOKS.

The History of Mankind. By FRIEDRICH RATZEL.

Translated from the second German edition by A. J. BUTLER, M.A. With introduction by E. B. TYLOR, D.C.L., F.R.S. London, Macmillan & Co. 1898. Colored plates, maps and illustrations. Volume III. 8vo. Pp. 599.

The first edition of Ratzel's 'Völkerkunde,' which has been in our libraries for ten years, is divided into three substantial parts or volumes, the third of which is taken up with the more cultured peoples that are outside of the age of steel and steam. For some reason or other, the order of the work has been changed in the English edition. The higher American peoples are thrust out; Africa obtrudes itself into

Volume III., so that it really commences on page 149. It is with the remaining pages that we have here to deal.

The proper appreciation of this volume and, indeed, of the whole work, demands of the reader familiarity with his Peschel, Friedrich Müller, Brinton and Keane, and he would do well to have near by a set of Standford's Compendiums. It is not a treatise on ethnology—the work would be vastly improved by a few tables showing the connection and affiliation of peoples—but a discussion of human artificialities in relation to certain culture areas.

The eastern hemisphere presents to the student a number of arenas on which the drama of mankind has been enacted. On these, races come and go, but Nature's life repeats itself and the forces of progress and reaction are imperceptibly active in them.

In speaking of this play of culture-influences between Africa and Asia the author develops the Erythrean, or Red Sea group of peoples. In contrast with Dr. Brinton's emphasis upon the Hamite and West African forces, Ratzel looks eastward for the predominating influences.

The arena for the sharp conflict between nomad pastorals and settled tillers is found in a broad strip of territory extending diagonally from 10° to 60° north latitude and from the Atlantic to the Pacific.

India is for the author a region where races have been broken up, pulverized and kneaded by conquerors. Doubtless a pre-Dravidian negroid type came first, of low stature and mean physique, though these same are, in India, also the result of poor social and economic conditions. Dravidians succeeded negroids, and there may have been Malay intrusions, but Australian affinities are denied. Then succeeded Aryan and Mongol, forming the present *pot pourri* through conquest and blending.

Northward of India, as suggested, the settled Iranian and the nomad Mongol furnish to the author the best opportunity to study and develop the thought ever dominant in his mind. In the history of mankind the lots fall diversely, but to each race its task is assigned, and none is left without opportunity of casting its threads into the great fabric.

In southeastern Asia, Ratzel sees a great